

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listing of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Currently amended) A watermark embedding process using a sub-band filtering, wherein original data for an entire image are split into $N \times N$ blocks and then is transformed into a frequency domain with N being ~~not necessarily~~ an integer greater than 1, and an HH band with $N/2 \times N/2$ coefficients is tested on a high frequency feature; ~~the high frequency being recorded for watermark insertion;~~ transforming a full watermark image data being transformed into the frequency domain with full picture; LL [[-]] band coefficients of the watermark image data being quantized and inserted into a block of the HH band of a marked block of the original data having the tested high frequency feature; a composite data of the original data and the watermark data being ~~capable of being created~~ produced by an inverse transformation of each block of the original data.

Claim 2 (Currently amended) ~~A The watermark embedding process of Claim 1 further containing~~ comprising original data for an entire image being split into $N \times N$ blocks and then transformed into a frequency domain with N is an integer greater than 1, and an HH band with $N/2 \times N/2$ coefficients being tested on a high

frequency feature; the high frequency being recorded for watermark insertion;
watermark data being transformed into the frequency domain with data of the
entire image; LL band coefficients being quantized and inserted into the HH band
of a marked block of the original data; a composite data of the original data and
the watermark data being produced by an inverse transformation of each block of
the original data; extraction of the watermark image data utilizes four keys for
~~watermark-extraction:~~ (a) Privacy Key providing position of the marked blocks;
(b) Permutation Function key decrypting random values into normal ones; (c)
Quantization Table of \tilde{W}_{LL} : providing de-quantization for DCT coefficients of the
watermark; (d) Embedding Coefficient Location extracting the watermark
coefficient from the HH band of the marked blocks; thus allowing the watermark
to be extracted by means of first splitting the composite data into $N \times N$ blocks and
transforming same to DCT domain; the watermarking coefficients being capable
of being extracted from the HH band of each block with system keys; the
watermark being then restored without using an original data; the watermark
information being independent of the original data, allowing the system key to be
pre-stored in the decoder.

Claim 3 (Currently amended) A codebook based watermarking of the process of
Claim 1, wherein the original data and watermark data all are transformed to the

frequency domain with full pictures, and the coefficient matrix of the original data are contents of the codebook; each watermarking coefficient being mapped to the codebook and inserted to the codebook; a best match being found and a coordinate thereof being recorded as the system key; the composite data being created from a modified codebook.

Claim 4 (Original) A composite system of the encryption and the watermark of the process as claimed in Claim 2, wherein the encryption is used to increase the security level and then watermarking process is used to hide the encrypted data; the key being encrypted and further watermarked by a second layer hidden; an encrypted bit of key being embedded to the LSB of the original data.

Claim 5 (Original) A JPEG processing of the watermark embedding process of Claim 4, wherein the bit of key is inserted to the LSB bit of non-zero DCT coefficient, and LL band of the watermark data for key information is scanned by a zigzag scan and a maximum weight scan to JPEG domain.

Claim 6 (Original) The watermark embedding process of Claim 1, wherein the watermark can be restored with only a certain degree of blurring but no serious distortion when the original data is under attack.

Claim 7 (Original) The watermark embedding process of Claim 1, wherein the watermark data include audio and video ones.

Claim 8 (Original) The watermark embedding process of Claim 1, wherein the watermark is gray-level data.

Claim 9 (Original) The watermark embedding process of Claim 1, wherein the watermark is binary data.

Claim 10 (Currently amended) The watermark embedding process of Claim 1, wherein the transformation is ~~not necessarily the~~ a DCT (discrete Cosine transform).

allegations